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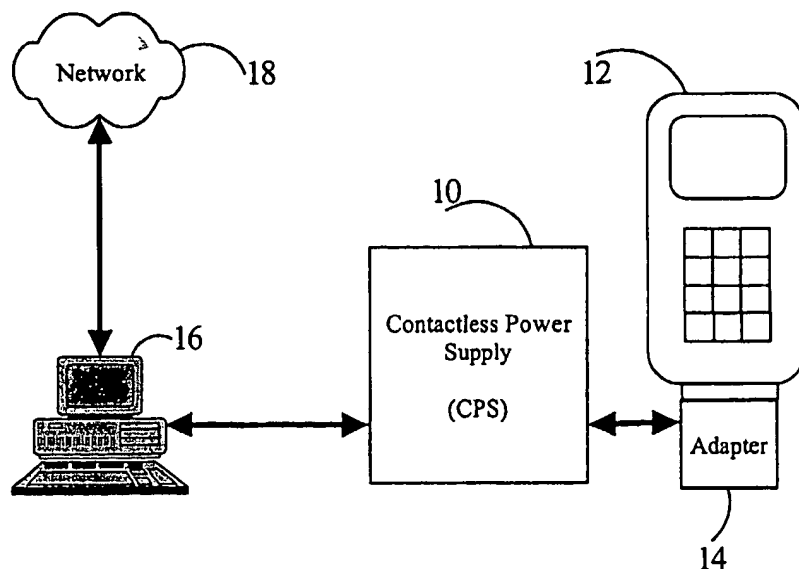
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ance Notes on Codes and Abbreviations" appearing at the begin-  
ning of each regular issue of the PCT Gazette.

(54) Title: ADAPTER



(57) Abstract: An adapter allows a remote device to use a contactless power supply. The adapter has a contactless power interface for receiving power from a contactless power supply and a power regulator for supplying power to the remote device. The adapter may have a rechargeable power source for operating the adapter and a power regulator.

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/US2004/001730

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 H02J7/02 H02J5/00

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 H02J

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|------------|---|-----------------------|
| X          | US 5 341 280 A (DIVAN DEEPAKRAJ M ET AL)<br>23 August 1994 (1994-08-23)   | 1                     |
| Y          | abstract<br>figures 1,13,14,18<br>column 2, line 45 - column 3, line 37<br>column 5, line 3 - line 24<br>-----              | 2-22                  |
| Y          | WO 00/54387 A (EA TECH LTD ; JUBY LEE<br>(GB)) 14 September 2000 (2000-09-14)<br>abstract<br>figures<br>claims 1,2<br>----- | 2-22                  |
| A          | US 2003/006880 A1 (ZIMMER HERBERT)<br>9 January 2003 (2003-01-09)<br>abstract<br>figures 2a-2d<br>-----<br>-/--             | 1-8,<br>13-20         |

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

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## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

| Category * | Citation of document, with indication, where appropriate, of the relevant passages   | Relevant to claim No. * |
|------------|--|-------------------------|
| A          | <p>GULKO M ET AL: "Inductor-controlled current-sourcing resonant inverter and its application as a high pressure discharge lamp driver"</p> <p>APPLIED POWER ELECTRONICS CONFERENCE AND EXPOSITION, 1994. APEC '94. CONFERENCE PROCEEDINGS 1994., NINTH ANNUAL ORLANDO, FL, USA 13-17 FEB. 1994, NEW YORK, NY, USA,IEEE, 13 February 1994 (1994-02-13), pages 434-440, XP010118538</p> <p>ISBN: 0-7803-1456-5</p> <p>abstract</p> <p>figure 1</p> <p>-----</p> | 1-8,<br>13-20           |
| A          | <p>WO 01/80396 A (SAKAKIBARA KAZUYUKI ; MAKITA CORP (JP))</p> <p>25 October 2001 (2001-10-25)</p> <p>&amp; EP 1 291 999 A (MAKITA CORP)</p> <p>12 March 2003 (2003-03-12)</p> <p>abstract</p> <p>figures 1,2,5,12,13</p> <p>-----</p>  | 1-4,<br>13-17           |
| A          | <p>US 5 600 225 A (GOTO MASATAKA)</p> <p>4 February 1997 (1997-02-04)</p> <p>the whole document</p> <p>-----</p>   | 1-22                    |
| A          | <p>EP 1 209 791 A (SALCOMP OY)</p> <p>29 May 2002 (2002-05-29)</p> <p>the whole document</p> <p>-----</p>  | 1-22                    |
| A          | <p>US 6 252 380 B1 (KOENCK STEVEN E)</p> <p>26 June 2001 (2001-06-26)</p> <p>abstract</p> <p>-----</p>   | 1-22                    |

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US2004/001730

### Box II Observations where certain claims were found unsearchable (Continuation of Item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

### Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1-22

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-22

Adapter for a remote device having a remote device rechargeable source, where the adapter comprises a controller controlling a power regulator in the adapter  
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2. claims: 23-31

Method of operating an adapter for charging a remote device with power from a contactless power supply, where the contactless power supply receives power requirement information from the remote device.  
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3. claims: 32-46

Adapter for supplying power to a remote device from a contactless power supply, where the secondary coil in the adapter, integrates three coils orthogonal among them.  
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## INTERNATIONAL SEARCH REPORT

International Application No

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| Patent document<br>cited in search report |    | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|----|---------------------|----------------------------|---------------------|
| US 5341280                                | A  | 23-08-1994          | US 5301096 A               | 05-04-1994          |
| WO 0054387                                | A  | 14-09-2000          | AU 2930900 A               | 28-09-2000          |
|   |    |                     | WO 0054387 A1              | 14-09-2000          |
|   |    |                     | GB 2347801 A ,B            | 13-09-2000          |
| US 2003006880                             | A1 | 09-01-2003          | DE 19621076 A1             | 27-11-1997          |
|   |    |                     | WO 9745807 A1              | 04-12-1997          |
|   |    |                     | DE 59704539 D1             | 11-10-2001          |
|   |    |                     | EP 0901664 A1              | 17-03-1999          |
| WO 0180396                                | A  | 25-10-2001          | EP 1291999 A1              | 12-03-2003          |
|   |    |                     | WO 0180396 A1              | 25-10-2001          |
|   |    |                     | US 2003090239 A1           | 15-05-2003          |
| EP 1291999                                | A  | 12-03-2003          | EP 1291999 A1              | 12-03-2003          |
|   |    |                     | WO 0180396 A1              | 25-10-2001          |
|   |    |                     | US 2003090239 A1           | 15-05-2003          |
| US 5600225                                | A  | 04-02-1997          | JP 2671809 B2              | 05-11-1997          |
|   |    |                     | JP 8019185 A               | 19-01-1996          |
|   |    |                     | AU 691909 B2               | 28-05-1998          |
|   |    |                     | AU 2184495 A               | 18-01-1996          |
|   |    |                     | GB 2291291 A ,B            | 17-01-1996          |
|   |    |                     | GB 2330461 A ,B            | 21-04-1999          |
| EP 1209791                                | A  | 29-05-2002          | FI 20002493 A              | 15-05-2002          |
|   |    |                     | EP 1209791 A2              | 29-05-2002          |
|   |    |                     | JP 2002199712 A            | 12-07-2002          |
|   |    |                     | US 2002057584 A1           | 16-05-2002          |
| US 6252380                                | B1 | 26-06-2001          | US 6075340 A               | 13-06-2000          |
|   |    |                     | US 5883493 A               | 16-03-1999          |
|   |    |                     | US 5619117 A               | 08-04-1997          |
|   |    |                     | US 5508599 A               | 16-04-1996          |
|   |    |                     | US 5278487 A               | 11-01-1994          |
|   |    |                     | US 4961043 A               | 02-10-1990          |
|   |    |                     | US 4885523 A               | 05-12-1989          |
|   |    |                     | US 6043630 A               | 28-03-2000          |
|   |    |                     | US 5856737 A               | 05-01-1999          |
|   |    |                     | US 5363031 A               | 08-11-1994          |
|   |    |                     | US 6075342 A               | 13-06-2000          |
|   |    |                     | US 5696435 A               | 09-12-1997          |
|   |    |                     | US 5463305 A               | 31-10-1995          |
|   |    |                     | US 4737702 A               | 12-04-1988          |
|   |    |                     | US 4709202 A               | 24-11-1987          |
|   |    |                     | US 4716354 A               | 29-12-1987          |
|   |    |                     | US 4553081 A               | 12-11-1985          |
|   |    |                     | US 2002101218 A1           | 01-08-2002          |
|   |    |                     | US 6271643 B1              | 07-08-2001          |
|   |    |                     | US 5883492 A               | 16-03-1999          |
|   |    |                     | US 5889386 A               | 30-03-1999          |
|   |    |                     | US 5986435 A               | 16-11-1999          |
|   |    |                     | US 5493199 A               | 20-02-1996          |
|   |    |                     | CA 2022802 A1              | 06-06-1991          |
|   |    |                     | EP 0510015 A1              | 28-10-1992          |
|   |    |                     | WO 9108604 A1              | 13-06-1991          |
|   |    |                     | US 4845419 A               | 04-07-1989          |